

WHAT IS CLAIMED IS:

1. A ferritic stainless steel sheet comprising:
about 0.01 percent by mass or less of carbon;
about 1.0 percent by mass or less of silicon;
about 1.5 percent by mass or less of manganese;
about 11 to 23 percent by mass of chromium;
about 0.06 percent by mass or less of phosphorous;
about 0.03 percent by mass or less of sulfur;
about 1.0 percent by mass or less of aluminum;
about 0.04 percent by mass or less of nitrogen;
about 0.0005 to 0.01 percent by mass of boron;
about 0.3 percent by mass or less of vanadium;
about 0.8 percent by mass or less of niobium and/or 1.0 percent by mass or less of titanium
wherein $18 \leq \text{Nb}/(\text{C} + \text{N}) + 2(\text{Ti}/(\text{C} + \text{N})) \leq 60$; and
the balance being iron and unavoidable impurities, wherein the average crystal grain diameter
is about 40 μm or less and the average surface roughness is about 0.3 μm or less.
2. The ferritic stainless steel sheet according to claim 1, further comprising at least one of
about 0.1 to about 1.0 percent by mass of copper; about 0.05 to about 0.2 percent by mass of cobalt;
and about 0.1 to about 2.0 percent by mass of nickel, wherein $0.05 < (0.55 \times \text{Cu} + 0.85 \times \text{Co} + \text{Ni}) < 0.30$.
3. The ferritic stainless steel sheet according to claim 1, further comprising about 0.0007 to
about 0.0030 percent by mass of calcium.

4. The ferritic stainless steel sheet according to claim 2, further comprising about 0.0007 to about 0.0030 percent by mass of calcium.

5. The ferritic stainless steel sheet according to one of claims 1 to 4, wherein a resin coating film having a thickness of about 2.0 μm or more is provided on a surface of the ferritic stainless steel sheet.

6. The ferritic stainless steel sheet according to claim 4, wherein the resin coating film comprises one of urethane resins and epoxy resins.

7. A method for making a ferritic stainless steel sheet, comprising the steps of:

hot-rolling a steel slab comprising about 0.01 percent by mass or less of carbon; about 1.0 percent by mass or less of silicon; about 1.5 percent by mass or less of manganese; about 11 to about 23 percent by mass of chromium; about 0.06 percent by mass or less of phosphorous; about 0.03 percent by mass or less of sulfur; about 1.0 percent by mass or less of aluminum; about 0.04 percent by mass or less of nitrogen; about 0.0005 to about 0.01 percent by mass of boron; about 0.3 percent by mass or less of vanadium; about 0.8 percent by mass or less of niobium and/or about 1.0 percent by mass or less of titanium wherein $18 \leq \text{Nb}/(\text{C} + \text{N}) + 2(\text{Ti}/(\text{C} + \text{N})) \leq 60$; and the balance being iron and unavoidable impurities to form a hot-rolled sheet;

annealing the hot-rolled sheet to form an annealed sheet;

cold-rolling the annealed sheet either once or at least two times with intermediate annealing to form a cold-rolled sheet; and

finish-annealing and pickling the cold rolled sheet to form a pickled steel sheet containing crystal grains having an average crystal grain diameter of about 40 μm or less and has an average surface roughness of about 0.3 μm or less.

8. The method according to claim 7, wherein the steel slab further comprises at least one of about 0.1 to about 1.0 percent by mass of copper; about 0.05 to about 0.2 percent by mass of cobalt; and about 0.1 to about 2.0 percent by mass of nickel, wherein $0.05 < (0.55 \times \text{Cu} + 0.85 \times \text{Co} + \text{Ni}) < 0.30$.

9. The method according to claim 7, wherein the steel slab further comprises about 0.0007 to about 0.0030 percent by mass of calcium.

10. The method according to claim 8, wherein the steel slab further comprises about 0.0007 to about 0.0030 percent by mass of calcium.

11. The method according to one of claims 7 to 9, further comprising skin-pass rolling the pickled steel sheet.

12. The method according to one of claims 7 to 10, further comprising forming a resin coating film having a thickness of about $2.0 \mu\text{m}$ on a surface of the ferritic steel sheet.

13. The method according to claim 12, wherein the resin coating film comprises a urethane resin.

14. The method according to claim 12, wherein the resin coating film comprises an epoxy resin.